

Photonic Sensor for Nondestructive Testing of Composite Overwrapped Pressure Vessels, Phase II

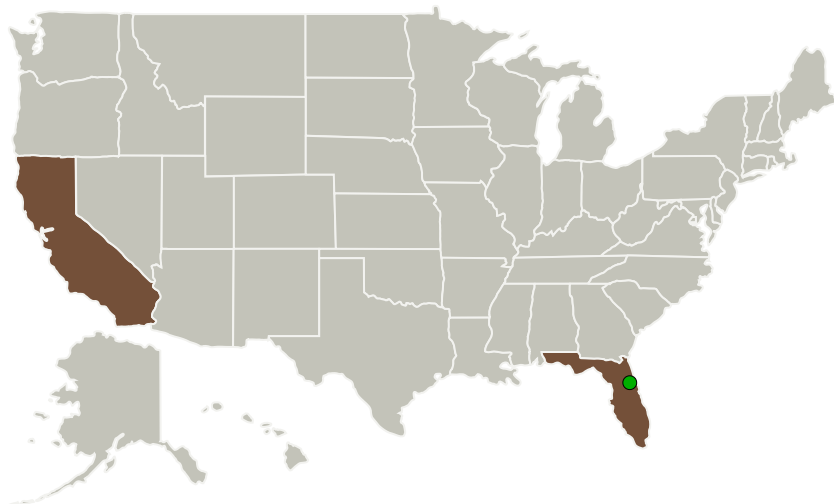
Completed Technology Project (2010 - 2013)



Project Introduction

Los Gatos Research proposes to develop a new automated health monitoring sensor system capable of monitoring distributed load and acoustic emission (AE) for rapid inspection of damages in composite overwrapped pressure vessels (COPV). Our novel sensor technology offers a number of advantages including sensor compactness and lightweight with multiplexing capability for load and AE for monitoring and characterizing damages in advanced composite structures and components. We achieve this by employing Bragg grating sensor arrays and using a novel interrogation technique combined with state-of-the-art AE method to detect and pinpoint composite defects in these structures. In Phase I, we have demonstrated the sensor's capability to measure crack-induced acoustic emissions in a composite overwrapped pressure vessel structure loaded up to rupture pressure. In Phase II, the grating sensors, interrogation system, and diagnostic software will be integrated into an automated system, capable of measuring and correlating the load history, acoustic emission activity, and determining the severity of damages and their location in the COPV. This dedicated prototype will include an integrated fiber optic conditioning hardware, state-of-the-art AE hardware and software, and address the power and stability requirements unique to ground based and in-flight studies.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Los Gatos Research	Lead Organization	Industry	Mountain View, California
● Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida

Primary U.S. Work Locations	
California	Florida

Project Transitions

January 2010: Project Start

April 2013: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139332>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Los Gatos Research

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

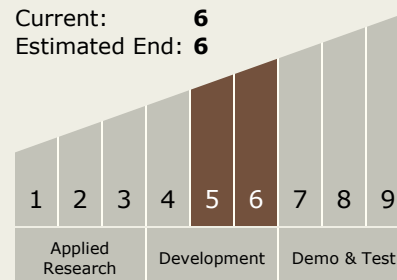
Carlos Torrez

Principal Investigator:

An-dien L Nguyen

Technology Maturity (TRL)

Start: 5
Current: 6
Estimated End: 6



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Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.2 Test and Qualification
 - └ TX13.2.3 Non-Destructive Inspection, Evaluation, and Root Cause Analysis

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System